

# High-resolution and High-efficiency Phase Zone Plates for EUV Applications

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Fresnel zone plates have been utilized widely in soft x-ray and EUV imaging. Compared to other focusing optics used for these wavelengths, zone plates have the advantage of high resolution. At the Advanced Light Source at Lawrence Berkeley National Laboratory, a full-field transmission microscope, XM-1, has demonstrated the ability to resolve 25-nm, 1:1 dense lines, using an objective micro zone plate with the outermost zone width of 25 nm and a 9-mm-in-diameter condenser zone plate. This paper discusses a process for fabrication of Molybdenum phase zone plates, which have a theoretical first-order efficiency of 30% at a wavelength of 13.4 nm. Such zone plates can potentially be used in EUV mask inspection and other high-resolution imaging applications.

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